REMARKS

Claims 1-17 and 23-25 are pending in the application. New claims 26 and 27 have been added by this amendment. Therefore, claims 1-17 and 23-27 are at issue.

Support for new claims 26 and 27 can be found in the specification and the original claims, for example, claims 1, 2, 3, and 4.

The courteous interview granted by prior Examiner Taylor to applicants' undersigned attorney on June 23, 2009 is hereby acknowledged with appreciation. During the interview, the pending claims, outstanding Office Action, cited references, and proposed claim amendments were discussed.

In a previous action, the examiner indicated that a certified copy of the priority documents was not received. As previously noted, the present application is a §371 application of PCT Application No. PCT/EP05/003009, and the priority document was filed during the international phase of the application. See Notice of Acceptance of Application under 35 U.S.C. §371 mailed on July 13, 2007, clearly stating that the priority documents have been received. In view of the above, it is requested that the examiner acknowledges foreign priority in the next communication in connection with the above-identified application.

Claims 1, 3-9, 12, 13, 16, 17, and 23-25 stand rejected under 35 U.S.C. §103 as being obvious over Goldman et al. U.S. Patent No. 5,562,646 ('646) in view of Allen U.S. Patent No. 5,786,429 ('429), as evidenced by Dvornic et al. U.S. Patent No. 5,739,218 ('218), in view of Kobayashi U.S. Patent No. 5,489,469 ('469). Applicants traverse this rejection.

Claim 1 recites swellable hydrogel-forming polymer particles having at least one hydrophilic polymer of dendritic structure (dendritic polymer) and at least one water-insoluble phosphate present on the surfaces of the particles.

Example 5 provides an excellent description of the invention recited in independent claim 1 and the dependent claims. In particular, the example discloses the preparation of superabsorbent (SAP) particles from a monomer solution containing partially

neutralized acrylic acid (specification, page 19, line 41 through page 20, line 6). The SAP particles are dried, then sized to a desired particle size range by sieving (specification, page 20, lines 8 and 9). The SAP particles then are postcrosslinked, wherein the postcrosslinking solution contains a dendritic polymer (BOLTORN H40) and tricalcium phosphate (specification, page 20, lines 29-36). The postcrosslinking solution is sprayed onto the SAP particles to position the dendritic polymer and water-insoluble phosphate on the surfaces of the SAP particles (specification, page 20, lines 40-41). The dendritic polymer and water-insoluble phosphate also can be applied to the SAP particle surfaces in the same manner in the absence of a surface postcrosslinker (specification, page 5, lines 30-35, for example).

Postcrosslinked SAP particles are illustrated in the previously provided Exhibit A, i.e., page 97 from *Modern Superabsorbent Polymer Technology*, T. Buchholz et al. eds. (1998). Fig 3.9 of page 97 illustrates the positioning of the dendritic polymer and water-insoluble phosphate on the surfaces of the SAP particles, with or without surface postcrosslinking.

The swellable hydrogel-forming polymer particles of the present claims therefore comprise (a) an SAP particle, (b) a dendritic polymer, and (c) a water insoluble phosphate, wherein both (b) and (c) are present on the surfaces of the SAP particles.

To establish a *prima facie* case of obviousness, three requirements must be satisfied. First, as the U.S. Supreme Court held in *KSR International Co. v. Teleflex Inc. et al.*, 127 S.Ct. 1727 (2007), "a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. ...it [may] be necessary for a court to look to interrelated teachings of multiple patents; the effects in the fashion claimed by the patent at issue. ...it can be important to *identify* a *reason that would have prompted a person of ordinary skill in the relevant field to combine the elements* in the way the claimed new invention does...because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." (emphasis added, *KSR*, *supra*). Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen Inc. v. Chugai Pharm. Co.*, 18 USPQ2d 1016, 1023 (Fed. Cir. 1991). Lastly,

the prior art references must teach or suggest all the limitations of the claims. In *re Wilson*, 165 USPQ 494, 496 (C.C.P.A. 1970).

As recently articulated by the Court of Appeals for the Federal Circuit in *Ortho-McNeil Pharmaceutical Inc. v. Mylan Laboratories Inc.*, 86 USPQ 2d, 1196, 1201-2 (Fed. Cir. 2008):

> "As this court has explained, however, a flexible TSM test remains the primary guarantee against a non-statutory hindsight analysis such as occurred in this case. *In re Translogic Tech., Inc.* 504 F.3d 1249, 1257 [84 USPQ 2d 1929] approach to the TSM test prevents hindsight and focuses on evidence before the time of invention.)."

The '646 patent discloses an absorbent core containing a hydrogel forming absorbent polymer, i.e., an SAP. The absorbent core can further contain fibrous materials, such as cotton, kemp, flax, synthetic fibers, etc., as set forth at columns 23-26 of the '646 patent. The '646 patent fails to teach or suggest *any* dendritic polymers. SAP and fibrous materials of the '646 patent are discrete materials that are simply admixed and retain their individual identities.

The primary '646 patent is relied upon for disclosing SAP particles, and the secondary '429 patent is relied upon for disclosing a polymer of dendritic structure. However, as discussed at the interview, the '429 patent does not disclose a polymer of dendritic structure, but merely an intralinked polyamidoamine prepared in a single step process by reacting a polyamidoamine prepolymer and a crosslinking agent (see '429 patent, column 1, lines 57-63) to provide the polymeric structure of Fig. 1 of the '429 patent. The polymer in that figure is not a polymer of dendritic structure.

The '218 patent cited by the examiner is directed to dendritic polymers, and such radially layered polymers have a substantially different structure than the crosslinked polymer of the '429 patent. The '218 patent cited the publication, D.A. Tomalia, *Scientific American*, *272* page 62-66 (1995), submitted concurrently with this amendment as Exhibit B, which illustrates the radial structure of a dendritic polymer resulting from the stepwise reactions used to prepare a dendritic polymer. The stepwise preparation of a dendritic

polymer also is discussed in the present specification at page 4, lines 10-13. Applicants further provide a technical brochure for BOLTORN® dendrite polymers as Exhibit C, which provides another illustration of a dendritic polymer.

It should further be noted that the '218 patent discloses differences between dendritic polymers and other polymers at column 1, lines 44-46. In short, the term "polyamidoamine" defines the types of bonding in the polymer, but not the structure of the polymer. Thus, the recitation of a polyamidoamine (e.g., claim 3) is not rendered obvious by the '646 and '429 patents because the '429 patent does not disclose a dendritic polymer.

In the Advisory Action of September 2, 2009, the examiner incorrectly states that the '429 patent discloses a dendritic polymer, as evidenced by a Dvornic et al. publication accompanying the Advisory Action, i.e., *Science Spectra, No. 5*, (1996), pages 36-41. The examiner specifically relies upon Fig. 1, IV column (a), stating that the '429 patent discloses a random hyperbranched dendritic polymer. This is totally incorrect. The '429 patent discloses *crosslinked* polymers as shown in the Dvornic et al. publication, Figure 1, column II. Note that the '429 patent teaches *first* preparing a prepolymer, then intralinks the prepolymer. See '429 patent, column 1, lines 34-42 and particularly column 8, lines 33-40. In contrast, the Dvornic et al. publication specifically teaches that dendritic polymers are prepared by a *different* method that yield a different polymer structure, as set forth in Fig. 3 and at page 38, right column, second and third paragraphs of the Dvornic et al. publication. The polymer of the '429 patent is not one that "grows like a tree".

The '429 patent merely discloses intralinked polyamidoamines that are the reaction product of (a) an endcapped polyamidoamine prepolymer and (b) at least one intralinker. The '429 patent therefore teaches conventional crosslinked polyamidoamines that are prepared by reacting a preformed polyamidoamine prepolymer and a crosslinker. As result of this two step process, the polyamidoamine in Fig. 1 of the '429 patent shows a ring structure that is typical for crosslinked polymers. Such ring structures can also be found in Fig. 1 of the Dvornic et al. publication under column II "Cross-Linked". Further, the dendritic polymers disclosed by Dvornic et al. do not have any ring structure. Therefore, the '429 patent is limited to crosslinked polymers and simply does not disclose *any* form of a dendritic polymer.

It should be noted that the '429 patent distinguishes intralinking from crosslinking ('429 patent column 3, line 64 through column 4, line 13) because the '429 patent links prepolymer chains, whereas the '429 patent considers crosslinking to mean crosslinking of polymers during a polymerization step. In either case, an intralinker/crosslinker covalently links polymer chains together, one after formation of a prepolymer (intralinks) and the other during a polymerization step (crosslinks). Neither is a one-step reaction of a monomer of the type AB_x, which is required to form a polymer having a dendritic structure, as set forth below.

The examiner's attention also is directed to Exhibit D, i.e., U.S. Patent No. 5,731,095 ('095), having the same figure as Figure 1 of the Dvornic et al. publication. The '095 patent clearly teaches that a polymer of dendritic structure is a one-pot synthesis prepared from a *single* multi-functional monomer (B-Ay) on a core having A groups (column 3, lines 11-25). Also see '095 patent, column 2, lines 30-42, and column 3, lines 20-35. Importantly, see column 3, lines 44-46 referring to U.S. Patent No. 5,418,301 ('301), attached hereto as Exhibit E, for teaching methods of preparing hyperbranched polymers.

The '301 patent shows how a hyperbranched polymer is formed in a single pot from a core and a single multifunctional monomer. This is in contrast to the reaction between a preformed prepolymer and an intralinking agent as set forth in the '429 patent.

Applicants further provides Exhibits F, G, and H to show the differences between a polymer of the '429 patent and a claimed dendritic polymer. In Exhibit F, note that a *single* monomer is used to prepare the dendritic polymer. Also note the structure for a random growth, hyperbranched polymer that differs substanctially from the polymer of Figure 1 in the '429 patent.

In Exhibit G (U.S. Patent No. 6,632,889), see column 1, lines 19-45, especially column 1, lines 33-35, stating that random hyperbranched polymers are prepared via polycondensation of AB_x monomers ($x \geq 2$). Exhibit H (Zhao thesis, 2007) provides a background on various types of polymer, and specifically discloses hyperbranched polymers starting at page 121 in a one-step process from AB_2 monomers. All the enclosed exhibits demonstrate that the intralinked polymer of the '429 patent is *not* a polymer of dendritic

structure, but merely linear prepolymer chains that are linked together by an intralinker. Each intralinker disclosed in the '429 patent is a well-known crosslinking agent, e.g., compare page 10, line 33 through page 11, line 9 of the present specification to '429 patent, column 3, line 56 through column 4, line 39.

In addition, the '429 patent was cited because the polymers disclosed therein are wet and dry strength agents and adhesives for cellulosic and fibrous webs. However, the present claims are directed to hydrogel forming polymeric *particles*, and accordingly the benefits of wet strength, dry strength, and adhesion are not relevant. Such properties relate to papers, foams, and the like, but not particles. Further, adhesion between particles is a property to be avoided, not sought after. Persons skilled in the art therefore have no apparent reason to combine the teachings of the '429 patent and the '646 patent.

The tertiary '469 patent is directed to SAP particles having a fibrous material and an inorganic material on the surface of the particle. The '469 patent fails to teach or suggest any dendritic polymer. The Office Action states that the '469 patent teaches phosphates as improving the capacity, rate, and power of absorbing liquids. However, the '469 patent at column 1, lines 55-59 states that these are *desired* in a water-absorbent polymer, i.e., is the problem to be solved. The '469 patent attempts to solve this problem by applying a water-insoluble inorganic material *and* a fibrous material to a water-absorbent polymer particle (see '469 patent, column 2, lines 9-13). The '469 patent further teaches that the absence of any of these constituents has an adverse effect ('469 patent, column 3, lines 33-37). Persons skilled in the art therefore would have had no incentive to apply a water-insoluble inorganic to a particle surface, while omitting the fibrous material, with any reasonable expectation of providing a useful hydrogel-forming polymer particle.

For the reasons set forth above, and as discussed in the interview, it is submitted that the cited combination of references fails to render claims 1, 3-9, 12, 13, 16, 17, and 23-25 obvious under 35 U.S.C. §103. There is simply no apparent reason from the combination of references for a person skilled in the art to apply a dendritic polymer *and* a water-insoluble phosphate to the surfaces of a hydrogel-forming polymer particle.

Claim 2 stands rejected under 35 U.S.C. §103 as being obvious over the '646 patent in view of the '429 patent as evidenced by the '218 patent in view of the '469 patent and further in view of Sorensen et al. U.S. Patent No. 6,093,777 ('777). Applicants traverse this rejection.

The rejection of the claims over a combination of the '646, '429, '218, and '469 patents has been discussed above. The '777 patent fails to overcome the deficiencies of this combination of references.

The quaternary '777 patent teaches a dendritic polymer used in a thermosetting resin matrix to provide a toughening effect. First, the '777 patent is completely silent with respect to incorporating the dendritic polymer onto an SAP. SAPs are not thermosetting resins. Second, the present claims are directed to SAP particles that absorb several times their weight of aqueous media and swell. Therefore, a "toughening affect" is irrelevant with respect to particles, and is to be avoided because swelling of the particles in aqueous media may be impaired.

The examiner's comments in the Advisory Action relating to the fibrous material and calcium phosphate of the '469 patent, and the hydrogel of the '646 patent directed to a mixture of an SAP and fibrous material, would be relevant if the claimed hydrogel-forming polymer particles contained a fibrous material, but they do not. The '469 patent requires both the fibrous material and the inorganic material, and omitting the fibrous material would destroy the teachings of the '469 patent.

It also must be pointed out that the examiner's comments in the Advisory Action relating to "tough" are incorrect. An hydrogel-forming polymer does not lose critical crosslinks. Once formed, the crosslinks are permanent. The "toughness" referred to in the cited reference is entirely different from crosslink density. In the '777 patent, the dendritic polymer provides a toughening effect when a dendritic polymer is admixed with an epoxide and curing agent to provide a *thermosetting* resin having greater toughness, i.e., tensile properties, compressive properties, shear properties, and fatigue properties. These properties are relevant as to cured *thermosetting* polymers, but are not relevant to the particles of

hydrogel forming polymer, and are not remotely related to crosslinks or the purported loss of crosslinks. See '777 patent, column 6, lines 44-60, for example.

Therefore, it is submitted that claim 2 is patentable under 35 U.S.C. §103 for all the reasons set forth above, and that the rejection of claim 2 over the combination of cited references should be withdrawn.

Claims 10, 11, 14, and 15 stand rejected under 35 U.S.C. §103 as being obvious over the '646 patent in view of the '429 patent as evidenced by the '218 patent in view of the '469 patent and further in view of Heide et al. U.S. Patent Publication No. 2004/0014901 ('901 publication). Applicants traverse this rejection.

These claims recite preferred embodiments of the present invention. Applicants do not rely solely on the features recited in claims 10, 11, 14, or 15 for patentability, but rely upon all the features recited in these claims *and* in independent claim 1. Applicants have demonstrated the patentability of claim 1 above, and the disclosure of the quaternary '901 publication does not negate the patentability of independent claim 1. Therefore, it is submitted that claims 10, 11, 14, or 15 are patentable for the same reasons claim 1 is patentable, and that the rejection of these claims under 35 U.S.C. §103 should be withdrawn.

It is submitted that all claims are in a form and scope for allowance. An early and favorable action on the merits is respectfully requested.

Should the examiner wish to discuss the foregoing, or any matter of form in an effort to advance this application toward allowance, the examiner is urged to telephone the undersigned at the indicated number.

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Respectfully submitted,

By _____

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